



EERA-DTOC: Design tools for offshore clusters

Giebel, Gregor; Madsen, Peter Hauge; Hasager, Charlotte Bay; Lange, Bernhard; Cabezon, Daniel ; Schepers, Gerard ; Iuga, Dorina

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Gregor Giebel(1) (F) (P) Peter Hauge Madsen(1) Charlotte Hasager(1) Bernhard Lange(2) Daniel Cabezon(3) Gerard Schepers(4) Dorina Iuga(5)

(1) DTU Wind Energy, Roskilde, Denmark(2) Fraunhofer IWES, Kassel, Germany(3) CENER, Pamplona, Spain(4) ECN, Petten, The Netherlands(5) EWEA, Brussels, Belgium

Introduction

With the large amount of offshore wind farms to be built in the next years, clusters of wind farms will appear at favourable locations, like in the German Bight and Dogger Bank. Large arrays of floating wind farms planned near long-distance grid cables independent of water depth will also start to appear in the next years. The planning and design of these clusters pose new challenges with regards to the siting of the connected wind farms, the design of the interconnecting grid structure and the integration of the large amount of power into the electricity supply systems.

Approach

The European Energy Research Alliance (EERA) together with high-impact industry partners will assemble an integrated and validated design tool combining the state-of-the-art wake, yield and electrical models available in the consortium, as a plug-in architecture with possibility for third party models.

Main body of abstract

The objective of the development is to optimise the exploitation of individual wind farms as well as wind farm clusters, from the resource and farm wake to the electrical system including ancillary services. Also other wind farm challenges under the offshore conditions will be addressed.

To decrease uncertainties around wind farm wake predictions, a small measurement campaign together with the new data available from the industry partners will enable better tuning, and eventually better modelling of the far-field of wind farm wakes. The concept of the EERA-DTOC project is to combine this expertise in a common integrated software tool for the optimised design of offshore wind farms and wind farm clusters acting as wind power plants. The only point less well known, due to the lack of good data so far, is the behaviour of the wind farm wake, in particular far-field wake. Therefore, a small measurement campaign is planned and collection of lidar data and high-resolution satellite images to get better data. Key industry actors working as end users of the software will help in the design of the tool, and will afterwards verify the performance of the tool using their own data and test cases.

Conclusion

A new project is presented to combine about 20 tools for the design of offshore wind farms and wind farm clusters, with a possibility to add own tools later on. The tools integrate spatial planning, electrical interconnection, and yield modelling including wakes.